

Amendment to the Claims

This listing of claims will replace all prior versions and listings of claims in the above-referenced application.

1. (Currently amended) An isolated nucleic acid comprising a modified gene, the gene including a sequence that codes for a lysostaphin protein, wherein the lysostaphin protein differs from a naturally occurring version of lysostaphin produced by a host that naturally produces lysostaphin, wherein the encoded protein includes one or more alterations with respect to the naturally occurring version of lysostaphin, and wherein one or more of the alterations disrupts one or more mammalian glycosylation events, so that the non-mammalian protein is produced and secreted by mammalian cells in its active form and kills *Staphylococcus aureus* cells by hydrolyzing pentapeptide links of *Staphylococcus aureus* cell walls ~~is recognized by a polyclonal antibody that recognizes the naturally occurring version of lysostaphin.~~
2. (Previously presented) The nucleic acid of claim 1, wherein the modified gene comprises at least one mammalian regulatory sequence operatively linked to the sequence that codes for the lysostaphin protein.
3. (Previously presented) The nucleic acid of claim 1 wherein the one or more alterations eliminates one or more glycosylation sites.
- 4 – 26. (Cancelled).
27. (Previously presented) The nucleic acid of claim 1, wherein the gene comprises a eukaryotic promoter operatively linked to the sequence that codes for the lysostaphin protein.
28. (Previously presented) The nucleic acid of claim 27, wherein the eukaryotic promoter is a tissue-specific promoter.
29. (Previously presented) The nucleic acid of claim 27, wherein the eukaryotic promoter directs expression of the gene in cells of the mammary gland.

30. (Previously presented) The nucleic acid of claim 1, wherein the gene encodes a eukaryotic secretion signal.
31. (Previously presented) The nucleic acid of claim 1, wherein the gene encodes a eukaryotic start codon, the Kozak expression start site consensus sequence, or both.
32. (Previously presented) The nucleic acid of claim 1, wherein the gene encodes a prepolysostaphin protein.
33. (Previously presented) The nucleic acid of claim 1, wherein the gene encodes a polysostaphin protein.
34. (Previously presented) The nucleic acid of claim 1, wherein the sequence is optimized to reflect eukaryotic codon usage.
35. (Currently amended) An isolated nucleic acid comprising a gene that encodes a lysostaphin protein, ~~wherein the lysostaphin protein is recognized by a polyclonal antibody that recognizes a naturally occurring version of lysostaphin, and~~ wherein the sequence of the lysostaphin protein contains at most one intact Asn-X-(Ser/Thr) sequence, so that the non-mammalian protein is produced and secreted by mammalian cells in its active form, and wherein the protein kills *Staphylococcus aureus* cells by hydrolyzing pentapeptide links of *Staphylococcus aureus* cell walls.
36. (Previously presented) The nucleic acid of claim 35, wherein the gene comprises at least one mammalian regulatory sequence operatively linked to the sequence that codes for the lysostaphin protein.
37. (Previously presented) The nucleic acid of claim 35, wherein the gene comprises a eukaryotic promoter operatively linked to the sequence that codes for the lysostaphin protein.
38. (Previously presented) The nucleic acid of claim 37, wherein the eukaryotic promoter is a tissue-specific promoter.

39. (Previously presented) The nucleic acid of claim 37, wherein the eukaryotic promoter directs expression of the gene in cells of the mammary gland.
40. (Previously presented) The nucleic acid of claim 35, wherein the gene encodes a eukaryotic secretion signal.
41. (Previously presented) The nucleic acid of claim 35, wherein the gene encodes a eukaryotic start codon, the Kozak expression start site consensus sequence, or both.
42. (Previously presented) The nucleic acid of claim 35, wherein the gene encodes a preprolysostaphin protein.
43. (Previously presented) The nucleic acid of claim 35, wherein the gene encodes a prolysostaphin protein.
44. (Previously presented) The nucleic acid of claim 35, wherein the sequence is optimized to reflect eukaryotic codon usage.
45. (New) An isolated nucleic acid that codes for an active lysostaphin protein encoded by a nucleic acid having a sequence set forth in SEQ ID NO: 3, wherein the active lysostaphin protein has both of its two sites for *N*-linked glycosylation in mammalian cells (Asn-X-(Ser/Thr)) altered with respect to the wild type lysostaphin protein, or a variant of SEQ ID NO: 3 that encodes an active lysostaphin protein in which only one of the sites for *N*-linked glycosylation is altered with respect to the wild type lysostaphin protein, wherein the active lysostaphin protein kills *Staphylococcus aureus* cells by hydrolyzing pentapeptide links of *Staphylococcus aureus* cell walls.
46. (New) The isolated nucleic acid of claim 45, wherein the nucleic acid codes for an active lysostaphin in which the Asn residue in either or both of the sites for *N*-linked glycosylation is deleted or replaced by a different amino acid.
47. (New) The isolated nucleic acid of claim 46, wherein the Asn residue in either or both of the sites for *N*-linked glycosylation is replaced by Gln.

48. (New) The isolated nucleic acid of claim 45, comprising SEQ ID NO: 3 or a variant thereof in which only one of the two Asn codons in the sites for *N*-linked glycosylation is altered relative to the wild type sequence.